

CLAIMS

1. A multi-layer heat-shrinkable film comprising at least a first outer heat-sealing layer (a) comprising one or more polyolefins; a second outer abuse layer (b) comprising a polyamide with melting point $\geq 175^{\circ}\text{C}$; and an intermediate gas barrier layer (c) comprising PVDC.
2. The multi-layer heat-shrinkable film of claim 1 wherein the polyamide of the outer abuse layer (b) has a melting point of from about 175°C to about 250°C ; preferably of from about 180°C to about 240°C ; more preferably of from about 185°C to about 230°C ; and still more preferably of from about 188°C to about 225°C .
3. The multi-layer heat-shrinkable film of claim 2 wherein the polyamide of the outer abuse layer (b), with a melting temperature of from about 188°C to about 225°C , is selected from the group consisting of copolyamides 6/12, copolyamides 6/66, polyamide 6 copolymers (modified polyamide 6) comprising less than 5 %, preferably less than 4 %, and even more preferably less than 3 % by weight of an aromatic co-monomer, copolyamides of polyamide 6 and a partially aromatic polyamide, and terpolyamides based on polyamide 6, polyamide 11, and polyamide 66.
4. The multi-layer heat-shrinkable film of claim 2 wherein the outer abuse layer (b) comprises at least 50 % by weight and preferably at least 60 % by weight of one or more polyamides with a m.p. $\geq 175^{\circ}\text{C}$, blended with an ethylene-vinyl alcohol copolymer.
5. The multi-layer heat-shrinkable film of claim 4 wherein the amount by weight of EVOH in the outer abuse layer (b) with respect to the overall weight of the layer is comprised between about 3 and about 40 % by weight, preferably between about 5 and about 35 % by weight, and even more preferably between about 10 and about 30 %.
6. The multi-layer heat-shrinkable film of claim 1 wherein the heat-sealing layer (a) comprises a single polyolefin or a blend of two or more polyolefins with melting temperature $< 140^{\circ}\text{C}$, preferably $< 130^{\circ}\text{C}$, and more preferably comprised between 80°C and about 128°C .

7. The multi-layer heat-shrinkable film of claim 6 wherein the heat-sealing layer (a) comprises heterogeneous or homogeneous ethylene-(C₄-C₈)- α -olefin copolymers having a density ≤ 0.915 g/cm³, blends thereof with minor amount of polyethylene homopolymers, ethylene-vinyl acetate copolymers, ethylene-acrylic or methacrylic acid copolymers including ionomers, blends of heterogeneous or homogeneous ethylene-(C₄-C₈)- α -olefin copolymers having a density from about 0.915 g/cm³ to about 0.930 g/cm³ with ethylene-vinyl-acetate copolymers or ethylene-alkyl (meth)acrylate copolymers, ethylene-propylene-butene ter-polymers, ethylene-alkyl acrylate-maleic anhydride ter-polymers.
8. The multi-layer heat-shrinkable film of claim 7 wherein the heat-sealing layer (a) comprises a heterogeneous or homogeneous ethylene-(C₄-C₈)- α -olefin copolymer having a density ≤ 0.915 g/cm³, and preferably a heterogeneous or homogeneous ethylene-(C₄-C₈)- α -olefin copolymer having a density comprised between about 0.895 g/cm³ and about 0.912 g/cm³.
9. The multi-layer heat-shrinkable film of claim 1 in the form of a seamless tubing wherein the outer heat-sealing layer (a) is the innermost layer of the tube.
10. A container obtained from a multi-layer heat-shrinkable film comprising at least a first outer heat-sealing layer (a) comprising one or more polyolefins; a second outer abuse layer (b) comprising a polyamide with melting point ≥ 175 °C; and an intermediate gas barrier layer (c) comprising PVDC, by a welding involving the outer heat-sealing layer (a), whereby said outer layer (a) is the inside layer of the container and the outer abuse layer (b) is the outside layer of the container.

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